

EXECUTIVE SUMMARY

Florida law requires the water management districts to develop a priority list and schedule for the establishment of minimum flows and levels for surface waters and aquifers within their jurisdiction (Section 373.042(1), Florida Statutes). This list, included in the *District Water Management Plan* for the South Florida Water Management District (SFWMD, 2000a), requires that minimum flows and levels for the St. Lucie River and Estuary be established by 2001. A request for extension of this deadline to December 2002 has been approved.

Establishing *minimum* flows and levels alone will not be sufficient to maintain a sustainable resource during the broad range of water conditions occurring in the managed system. For the St. Lucie River and Estuary, extended periods of large volume freshwater flows also impact the resource. Setting a minimum flow is viewed as a starting point to define minimum water needs for protection against significant harm. While this report documents the full range of water resource issues associated with the St. Lucie River and Estuary watershed, technical criteria development focuses on minimum flows.

The minimum flow is defined as the "...limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." For purposes of establishing minimum flows, significant harm is defined as a loss of water resource functions that takes more than two years to recover. Water resource functions protected under Chapter 373 include flood control, water quality, water supply and storage, fish and wildlife, navigation, and recreation. Water management districts must also consider any changes and structural alterations that have occurred, and develop a recovery and prevention strategy for water bodies that do not or are not expected to meet the proposed criteria during the planning horizon.

This report documents the methods and technical criteria used by staff of the South Florida Water Management District to develop minimum flows and levels for the St. Lucie River and Estuary. The St. Lucie River and Estuary watershed is located on the southeastern coast of Florida in Martin and St. Lucie Counties. It includes the North and South Forks of the St. Lucie River, several major drainage and irrigation canals, the surrounding watershed, and the estuary. This system is of particular importance because it lies at the confluence of two major transportation waterways. It is located adjacent to the Indian River Lagoon (part of the National Estuary Program), and provides an outlet for discharge of excess water from Lake Okeechobee.

Prior to development, most of the region was characterized by nearly level, poorly drained lands subject to frequent flooding. The current managed system includes numerous water control facilities that have been constructed to make this region suitable for agricultural, industrial, and residential use. Structural changes that were considered during criteria development included construction of major drainage canals; connection to

Lake Okeechobee, withdrawals of water to provide agricultural irrigation; dredging, filling, and bulkheading of the estuary; and improvements to the St. Lucie Inlet. Effects of such changes on regional hydrology and estuary hydrodynamics are documented. Over a century of water control has led to changes to the quality, quantity, timing, and distribution of flows to the estuary resulting in ecological changes to the system.

Pursuant to the requirements contained within Chapter 373 of the Florida Water Resources Act, water resource functions are identified and technical relationships of these functions to water flows and levels are described, based on the best available information. This information includes results of a literature review; analysis and synthesis of present and historical flow data; incorporation of data, results, and conclusions from previous and ongoing investigations; and the development and application of mathematical models and empirical flow/salinity relationships.

Proposed minimum flow criteria for the St. Lucie River and Estuary are linked to the concept of protecting valued ecosystem components from significant harm. The specific valued ecosystem components identified for the St. Lucie River and Estuary are the assemblage of organisms inhabiting the low salinity, oligohaline zone.

The proposed minimum flows and levels criteria for the St. Lucie River and Estuary were based on the determination that significant harm occurs to the oligohaline zone when net freshwater flows from (sum of surface and ground water inflows minus evaporation) to the estuary are at or below zero for a period of two consecutive months for two or more years in succession.

Modeling results indicate that mean monthly flows at or below 21 cubic feet per second in the North Fork of the St. Lucie River, in combination with mean monthly flows at or below 7 cubic feet per second in the South Fork of the St. Lucie River may result in significant harm to the St. Lucie Estuary.

Understanding the importance of maintaining the north south flow distribution pattern, but acknowledging the fact that we neither currently monitor the South Fork nor have any conveyance options to supplement South Fork flows, the following minimum flow criteria for the St. Lucie River and Estuary is proposed:

Mean monthly flows to the St. Lucie Estuary of more than 28 cubic feet per second from the North Fork of the St. Lucie River represent the amount of water necessary to maintain sufficient salinities in the St. Lucie Estuary in order to protect the oligohaline organisms that are valued ecosystem components of this system. If flows fall below this minimum for two consecutive months, the minimum flow criteria will be exceeded and harm occurs to estuarine resources. If harm, as defined above, occurs during two consecutive years, significant harm and a violation of the minimum flows and levels criteria occur.

Although the river and estuary presently receive an adequate supply of fresh water, and are expected to continue to do so as the Comprehensive Everglades Restoration Plan is implemented, a prevention strategy may be required to protect this resource. The ability to better manage water in the watershed may also make it possible to capture and retain water from the watershed for allocation to other (e.g., urban and agricultural water supply) users.

Prevention strategy components include management objectives for the North and South Forks that are based on protecting the system from significant harm. Also included in the prevention strategy is the recommendation for an adaptive assessment approach to research and monitoring of the watershed in order to fill data gaps in our knowledge of the hydrodynamics and ecology of the St. Lucie River and Estuary. The proposed criteria will be refined and incorporated in the Upper East Coast Water Supply Plan as new information is assimilated into the minimum flows and levels development process.

This document has been peer reviewed by an independent scientific peer review panel. Their report, in addition to the South Florida Water Management District staff response, is included in **Appendix I**. Also included in the appendices are technical reports used in support of criteria development.